



RESPONSE UNDER 37 C.F.R. 1.116  
EXPEDITED PROCEDURE-EXAMINING GROUP 2823

PATENT

Attorney Docket No. 5308-248

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Saxler et al.  
Serial No.: 10/617,843  
Filed: July 11, 2003

Confirmation No.: 7985  
Group Art Unit: 2823  
Examiner: Fernando L. Toledo  
For: **NITRIDE-BASED TRANSISTORS AND METHODS OF FABRICATION THEREOF  
USING NON-ETCHED CONTACT RECESSES**

Date: June 14, 2005

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**INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. § 1.97(d)**

Dear Sir:

Attached is a list of documents on Form PTO-1449, together with a copy of any listed foreign patent document and/or non-patent literature. A copy of any listed U.S. patent and/or U.S. patent application publication is not provided herewith in accordance with the amendment by the U.S. Patent and Trademark Office to 37 C.F.R. § 1.98(a)(2)(ii) effective October 21, 2004. Also enclosed is a translation or a concise explanation of each non-English language document enclosed. It is requested that these documents be considered by the Examiner and officially made of record in accordance with the provisions of 37 C.F.R. § 1.56 and Section 609 of the MPEP.

This Information Disclosure Statement is being filed after a Final Office Action under 37 C.F.R. § 1.113 or a Notice of Allowance under 37 C.F.R. § 1.311, but before payment of the Issue Fee. The Final Office Action or Notice of Allowance was mailed on April 20, 2005. In accordance with the requirements of 37 C.F.R. § 1.97(c)(2), a check for the \$180.00 fee specified in 37 C.F.R. § 1.17(p) is enclosed. This amount is believed to be correct; however, the Commissioner is authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-0220.

Respectfully submitted,

Elizabeth A. Stanek  
Registration No. 48,568

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**CERTIFICATE OF MAILING UNDER 37 CFR 1.8**

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Erin A. Campton

Substitute form 1449A/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet **1** of **3****Complete if Known**

Application Number	10/617,843
Filing Date	July 11, 2003
First Named Inventor	Saxler et al.
Group Art Unit	2823
Examiner Name	Fernando L. Toledo
Attorney Docket Number	5308-248

**U.S. PATENTS AND PATENT PUBLICATIONS**

Examiner Initials*	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Number	Kind Code (if known)		
	1.	US-6,150,680		Eastman et al.	11-21-2000
	2.	US-6,086,673		Molnar	07-11-2000
	3.	US-5,686,737		Allen	11-11-1997
	4.	US-4,755,867		Cheng	07-05-1988
	5.	US-2004/0241970	A1	Ring	12-02-2004
	6.	US-2003/0123829	A1	Taylor	07-03-2003
	7.	US-2002/0167023	A1	Charvarkar et al.	11-14-2002
	8.	US-2002/0008241	A1	Edmond et al.	01-24-2002

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	T
		Office	Number	Kind Code (if known)			
	9.	EP	0 334 006	A1	Siemens AG	09-27-1989	
	10.	JP	2004-342810		Fujitsu Ltd.	12-02-2004	Abstract
	11.	JP	11261053		Furukawa Electric Co. Ltd.	09-24-1999	Abstract
	12.	PCT	WO 04/008495		Cree, Inc.	01-22-2004	

**OTHER NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T
	13.	Ando et al., "10-W/mm AlGaIn-GaN HFET With a Field Modulating Plate," <i>IEEE Electron Device Letters</i> , 24(5), pp. 289-291 (May 2003).	
	14.	Chang et al., "AlGaIn/GaN Modulation-Doped Field-Effect Transistors with an Mg-doped Carrier Confinement Layer," <i>Jpn. J. Appl. Phys.</i> , 42:3316-3319 (2003).	
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	16.	Cho et al., "A New GaAs Field Effect Transistor (FET) with Dipole Barrier (DIB)," <i>Jpn. J. Appl. Phys.</i> 33:775-778 (1994).	
	17.	Coffie et al., "Unpassivated p-GaIn/AlGaIn/GaN HEMTs with 7.1 W/MMF at 10 GHz," <i>Electronic Letters online No. 20030872</i> , 39(19), (September 18, 2003).	
	18.	Gaska et al., "Self-Heating in High-Power AlGaIn/GaN HFET's," <i>IEEE Electron Device Letters</i> , 19(3), pp. 89-91 (March 1998).	
	19.	Hikita et al., "350V/150A AlGaIn/GaN Power HFET on Silicon Substrate With Source-via Grouding (SVG) Structure," <i>Electron Devices Meeting, 2004</i> , pp. 803-806, IEDM Technical Digest. IEEE International (Dec. 2004).	

Examiner Signature

Date Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute form 1449A/PTO		<b>Complete if Known</b>	
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		Examiner Name	Fernando L. Toledo
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	20.	Kanaev et al., "Femtosecond and Ultraviolet Laser Irradiation of Graphitelike Hexagonal Boron Nitride," <i>Journal of Applied Physics</i> , 96(8), pp. 4483-4489 (Oct. 15, 2004).	
	21.	Kanamura et al., "A 100-W High-Gain AlGaIn/GaN HEMT Power Amplifier on a Conductive N-SiC Substrate for Wireless Base Station Applications," <i>Electron Devices Meeting, 2004</i> , pp. 799-802, IEDM Technical Digest. IEEE International (Dec. 2004).	
	22.	Karmalkar et al., "Very High Voltage AlGaIn/GaN High Electron Mobility Transistors Using a Field Plate Deposited on a Stepped Insulator," <i>Solid State Electronics</i> , Vol. 45, pp. 1645-52 (2001).	
	23.	Kashahara et al., "Ka-band 2.3W Power AlGaIn/GaN Heterojunction FET," <i>IEDM Technical Digest</i> , pp. 677-680 (2002).	
	24.	Komiak et al., "Fully Monolithic 4 Watt High Efficiency Ka-band Power Amplifier," <i>IEEE MTT-S International Microwave Symposium Digest</i> , Vol. 3, pp. 947-950 (1999).	
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	27.	Manfra et al., "High Mobility AlGaIn/GaN Heterostructures Grown by Plasma-assisted Molecular beam epitaxy on Semi-Insulating GaN Templates Prepared by Hydride Vapor Phase Epitaxy," <i>Journal of Applied Physics</i> , 92(1), pp. 338-345 (July 1, 2002).	
	28.	Manfra et al., "High-Mobility AlGaIn/GaN Heterostructures Grown by Molecular-beam Epitaxy on GaN Templates Prepared by Hydride Vapor Phase Epitaxy," <i>Applied Physics Letters</i> , 77(18), pp. 2888-2890 (Oct. 30, 2000).	
	29.	Parikh et al., "Development of Gallium Nitride Epitaxy and Associated Material-Device Correlation for RF, Microwave and MM-wave Applications," Cree, Inc. (35 slides).	
	30.	Saxler et al., "III-Nitride Heterostructures on High-Purity Semi-Insulating 4H-SiC Substrates for High-Power RF Transistors," International Workshop on Nitride Semiconductors (July 19, 2004).	
	31.	Shiojima et al., "Improved Carrier Confinement by a Buried p-Layer in the AlGaIn/GaN HEMT Structure," <i>IEICE Trans. Electron.</i> , E83-C(12), (December 2000).	
	32.	"Thick AlN template on SiC substrate - Novel semi insulating substrate for GaN-based devices," © 2003 by TDI, Inc., <a href="http://www.tdii.com/products/AlN_SiCT.html">http://www.tdii.com/products/AlN_SiCT.html</a> .	
	33.	Tilak et al., "Influence of Barrier Thickness on the High-Power Performance of AlGaIn/GaN HEMTs," <i>IEEE Electron Device Letters</i> , 22(11), pp. 504-506 (Nov. 2001).	
	34.	United States Patent Application entitled "Improved Dielectric Passivation for Semiconductor Devices," Serial No. 10/851,507, filed May 22, 2004 (Cree Docket No. P0274).	
	35.	United States Patent Application entitled "Silicon Carbide on Diamond Substrates and Related Devices and Methods," Serial No. 10/707,898, filed January 22, 2004 (Cree Docket No. P0387).	
	36.	United States Patent Application entitled "Methods of Fabricating Nitride-Based Transistors with a Cap Layer and a Recessed Gate," Serial No. 10/897,726, filed July 23, 2004 (Attorney Docket No. 5308-392).	
	37.	United States Patent Application entitled "High Power Density and/or Linearity Transistors," Serial No. 11/005,107, filed December 6, 2004 (Attorney Docket No. 5308-511).	
	38.	United States Patent Application entitled "Field Effect Transistors (FETS) Having Multi-Watt Output Power at Millimeter-Wave Frequencies," Serial No. 11/005,423, filed December 6, 2004 (Attorney Docket No. 5308-512).	
	39.	United States Patent Application entitled "Group III Nitride Field Effect Transistors (FETs) Capable of Withstanding High Temperature Reverse Bias Test Conditions," Serial No. 11/080,905, filed March 15, 2005 (Attorney Docket No. 5308-516).	
	40.	United States Patent Application entitled "Aluminum Free Group III-Nitride Based High Electron Mobility Transistors and Methods of Fabricating Same," Serial No. 11/118,575, filed April 29, 2005 (Attorney Docket No. 5308-543).	
	41.	United States Patent Application entitled "Binary Group III-Nitride Based High Electron Mobility Transistors and Methods of Fabricating Same," Serial No. 11/118,675, filed April 29, 2005 (Attorney Docket No. 5308-544).	

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	42.	United States Patent Application entitled "Composite Substrates of Conductive And Insulating or Semi-Insulating Group III-Nitrides For Group III-Nitride Devices," Serial No. 11/103,127, filed April 11, 2005 (Attorney Docket No. 5308-551).	
	43.	United States Patent Application entitled "Thick Semi-Insulating or Insulating Epitaxial Gallium Nitride Layers and Devices Incorporating Same," Serial No. 11/103,117, filed April 11, 2005 (Attorney Docket No. 5308-553).	
	44.	United States Patent Application entitled "Cap Layers and/or Passivation Layers for Nitride-Based Transistors, Transistor Structures and Methods of Fabricating Same," Serial No. 10/996,249, filed November 23, 2004 (Attorney Docket No. 5308-373).	
	45.	Walker, J. L. B. (Ed.), <i>High Power GaAs FET Amplifiers</i> , Norwood, MA: Artech House, pp. 119-120 (1993).	
	46.	Wu et al., "3.5-Watt AlGaIn/GaN HEMTs and Amplifiers at 35 GHz," IEDM-2003, Cree, Inc.	
	47.	Wu et al., "3.5-Watt AlGaIn/GaN HEMTs and Amplifiers at 35 GHz," Cree Santa Barbara Technology Center, Goleta, CA 93117.	
	48.	Wu et al., "30-W/mm GaN HEMTs by Field Plate Optimization," <i>IEEE Electron Device Letters</i> , 25(3), pp. 117-119 (March 2004).	
	49.	Wu et al., "Bias-dependent Performance of High-Power AlGaIn/GaN HEMTs," <i>IEDM Technical Digest</i> , p. 378-380 (2001).	
	50.	Wu et al., "Linearity Performance of GaN HEMTs With Field Plates," DRC 2004, Cree, Inc.	
	51.	Wu et al., "Linearity Performance of GaN HEMTs With Field Plates," Cree Santa Barbara Technology Center, Goleta, CA 93117.	
	52.	Yu et al., "Schottky Barrier Engineering in III-V Nitrides via the Piezoelectric Effect," <i>Applied Physics Letters</i> , 73(13), pp. 1880-1882 (Sept. 28, 1998).	
	53.	Zhang et al., "High Breakdown GaN HEMT with Overlapping Gate Structure," <i>IEEE Electron Device Letters</i> , 21(9), pp. 421-423 (September 2000).	

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